FMT Swiss AG

Internal Gear Oil Pump 10 l/min

Part No. **23 337** 230 V-1~AC-50 Hz-0,5 kW
Part No. **23 321** DRST-230 V-1~AC-50 Hz-0,5 kW
Part No. **23 322** DRST-400 V-3~AC-50 Hz-0,84 kW
Part No. **23 321 001** DRST-valve-230 V-1~AC-50 Hz-0,5 kW
Part No. **23 322 001** DRST-valve-400 V-3~AC-50 Hz-0,84 kW

Operating Instructions and Safety Notes 89 386 932 A803 GB

FMT Swiss AG

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Operating instructions translation

Date of issue: 01 / 2025

We reserve the right to make design and product modifications, which serve to improve the product.

Table of Contents

1. Introduction

1.1. Preface

Please carefully read these operating instructions and observe in particular all safety notes!

Our staff will be pleased to provide support if you have any questions about the product.

Yours sincerely, FMT Swiss AG

1.2. Obligations of the personnel

Before they start to work, all persons who are entrusted to work on the oil pump, are obliged:
– to follow all applicable regulations on occupational safety and accident prevention.
– to read and to comply with all safety instructions and warning notes contained in these operating instructions.

Please observe the following instructions in the interest of all concerned:

- Refrain from any unsafe working methods!
- Adhere to all hazard and warning notes contained in this manual!
- In addition to this documentation, keep to all generally accepted safety rules, legal provisions as well as all other binding rules regarding occupational safety, accident prevention and environmental protection!
- Wear appropriate protective clothing in accordance with the work to be done!
- Perform only work for which you have been sufficiently trained and instructed!
- Only genuine spare parts as well as original tools and auxiliaries of the manufacturer are allowed to be used in order to ensure the functional safety and maintain the warranty coverage.

1.3. Symbols in this manual

1.3.1. Structure of the safety notes

The safety notes have the following structure:

SIGNAL WORD

Type and source of the hazard
– Consquences of non-compliance with the notes.
– Measures to avoid that risk.

Depending on the danger level, different signal words are used:

Signal word	Danger level	Consequences of non-compliance
DANGER	Imminent threat of danger	Death or serious bodily injury
WARNING	Possible threat of danger	Death or serious bodily injury
CAUTION	Possibly dangerous situation	Minor bodily injury
ATTENTION	Possibly dangerous situation	Damage to material property

NOTE

Indicates further information or tips which facilitate work.

1.3.2. Hazard symbols

Symbol	Meaning
	General hazard symbol. The warning note marked in this way contains supplementary information on the type of hazard.
	This symbol warns of dangerous electrical voltages.
	This symbol warns of a hazardous explosive atmosphere.

1.3.3. General symbols

Symbol	Meaning
■	A small black square indicates the work you have to perform.
–	The dash denotes lists.
⇨	The arrow identifies cross-references. If cross-references to other chapters are required within the text, the expression is shortened for reasons of clarity. Example: ⇨ Chapter 2 Safety notes. This means: please refer to chapter 2 for the safety instructions

2. Safety notes

Various dangers may occur if the oil pump is improperly handled during installation, commissioning and daily operation.

WARNING

Risk of injury and damage to material property because of improper handling!

- Hold the manual at the disposal of the operating staff at the usage site of the unit.
- Country-specific safety measures and accident prevention regulations must be observed.

2.1. Authorized personnel

Only qualified and authorized persons are allowed to operate and to work on the oil pump.

Persons are qualified if they are, due to their training, experience, instruction and knowledge of the relevant standards, able to assess assigned tasks and to identify potentially hazardous situations.

These persons must have been authorized by the person responsible for the safety of the unit and must be able to identify and to avoid potential dangers.

All persons charged with installation, operation, maintenance and repair work, must have read and understood this operation manual.

A copy of this operating manual must be stored permanently and ready at hand at the place of usage of the unit.

2.2 Notes on maintenance, cleaning and repair

Only qualified technical personnel is allowed to carry out repair work on the electrical system.

WARNING

Risk of injury and damage to material property because of improper maintenance and repair.

- **Maintenance work is only allowed when the pump is currentless.**
- **Only qualified personnel is allowed to perform maintenance work.**
- **Allow the pump to cool down prior to maintenance and service work.**
- Should unusual noises occur, immediately stop the diesel pump. Immediately identify and eliminate the cause in order to avoid consequential damages. Maintenance work is only allowed when the pump is currentless.

2.3 Intended conditions of use

The oil pumps may only be used for the delivery of lubricating oils up to SAE 90 and may only be connected to a suitable power source (see nameplate).

Proper use also includes compliance with the operating instructions, which must be read in full before commissioning.

During repairs to any electrical components, the appropriate safety and test requirements are to be observed.

Only genuine replacement parts are to be used for any repairs, because otherwise the warranty will be invalidated.

2.4 Reasonably foreseeable misuse

DANGER

Risk of injury and material damage from explosive vapors

- **Never use the pump to deliver oily or explosive fluids such as petrol or other fluids with similar flashpoints!**

DANGER

Risk of explosions

- Since the motor and the switch of the gear pump are **not** explosion-protected, the pump must **not** be operated in an explosion risk area.
- Smoking and naked flames are prohibited in the vicinity of the pump.
- Do **NOT** use the pump to deliver fuels of danger classification AI, AII and B.

Any departure from the usage stipulations (other fluid media, use of force) or user modifications (changes, use of non-original parts) can be dangerous and are considered as non-intended usage.

The use in the food industry is forbidden.

Pumping caustic or other hazardous chemical or biological substances is forbidden.

The user is liable for any damage resulting from non-intended use.

2.5 Dangers when handling the oil pump

DANGER

Risk of injury and material damage because of improper installation, electric current or contaminated media.

Never work on a pump that is running!

- Mount or remove attachments and accessories only when the pump is switched off.
- For your own safety, disconnect the pump in addition from the power supply.

Do not pump contaminated fluids!

- Take special care to ensure that there are no contaminants in the fluid to be pumped.
- Install a strainer on the suction pipe.

Risk of stumbling because of power cable and hoses!

- Lay the supply cable so that it will not cause any risk of stumbling.
- Provide oil hoses of sufficient length and lay them so that they will not cause any risk of stumbling.

Damaged attachments and accessories can lead to personal injury and material damage.

- Attachments and accessories must be checked for wear, splits or other damage throughout their period of use.
- Damaged accessories and attachments must be replaced immediately.
- Only use genuine switches and power cables as replacement parts.
- With reference to the period of use, please note the details in ZH 1/A45.4.2 or DIN 20066 Part 5.3.2.

2.6 Risks when handling lubricating oils

If improperly handled, lubricating oils can cause risks to human health or to the environment.

Escaping lubricating oils can cause environmental harm. Do not allow to enter sewage or ground water. Local and country rules and regulations relating to domestic water supplies and oil storage must be obeyed.

DANGER

Use of lubricating oils

- Lubricating oils may cause lung damage if swallowed.

NOTE

- Observe the safety information for lubricating oils!

3. Transport and temporary storage

Prior to any transport, check to ensure that there are no liquids (residues of lubricating oils) left in the pump. All additional attachments must be removed from the pump.

Do not use the cable to transport the pump!

Storage and transport conditions:

- Weather-protected storage with temperature control, protection against frost, moisture and rain. Maximum relative humidity: 80 %.
- Storage temperature range from 0 °C to +40 °C.

4. Design and functional description

The pump can be equipped with various FMT accessories.

The part number 23 337 internal gear oil pump 10 l/min. 230V-1~AC-50 Hz-0,5 kW consists of an electrically driven internal gear pump with bypass and a manually operated venting valve.

These models:
Part No. 23 321 internal gear oil pump 10 l/min. DRST-230V-1~AC-50 Hz-0,5 kW,
Part No. 23 321 001 internal gear oil pump 10 l/min. DRST-valve-230 V-1~AC-50 Hz-0,5 kW,
Part No. 23 322 internal gear oil pump 10 l/min. DRST-400V-3~AC-50 Hz-0,84 kW,
Part No. 23 322 001 internal gear oil pump 10 l/min. DRST-valve-400 V-3~AC-50 Hz-0,84 kW
are controlled by a diaphragm pressure switch.

In internal gear pumps, the pinion, also called the runner wheel, is driven by the motor drive shaft. Its teeth mesh with the outer gear wheel, causing it to rotate.

During rotation, spaces become free between teeth, the displacement volume increases and fluid is being sucked in.

In the teeth spaces, the fluid is transported to the discharge side. The crescent provides a seal between the suction and compression space.

As teeth move into teeth spaces, the displacement volume is reduced and the fluid is forced to the discharge port.

4.1 Area of application

The oil pump is only suitable for lubricating oils up to SAE 90.

The temperature of the delivery fluids must be between 10 °C and 60 °C.
The temperatures must not be above or below these limit values.

NOTE

- In addition to this documentation, all generally accepted safety rules, legal provisions as well as all other binding rules regarding occupational safety, accident prevention and environmental protection must be observed.

4.2 Requirements for the installation location

Facilities for filling and transferring must be constructed, installed, positioned, maintained and operated in such a way so as to ensure that no water pollution or other undesirable alterations of water properties occur.

According to the national laws, the operator of such an installation is responsible for continuously monitoring the compliance with the above stated requirements at the place of installation.

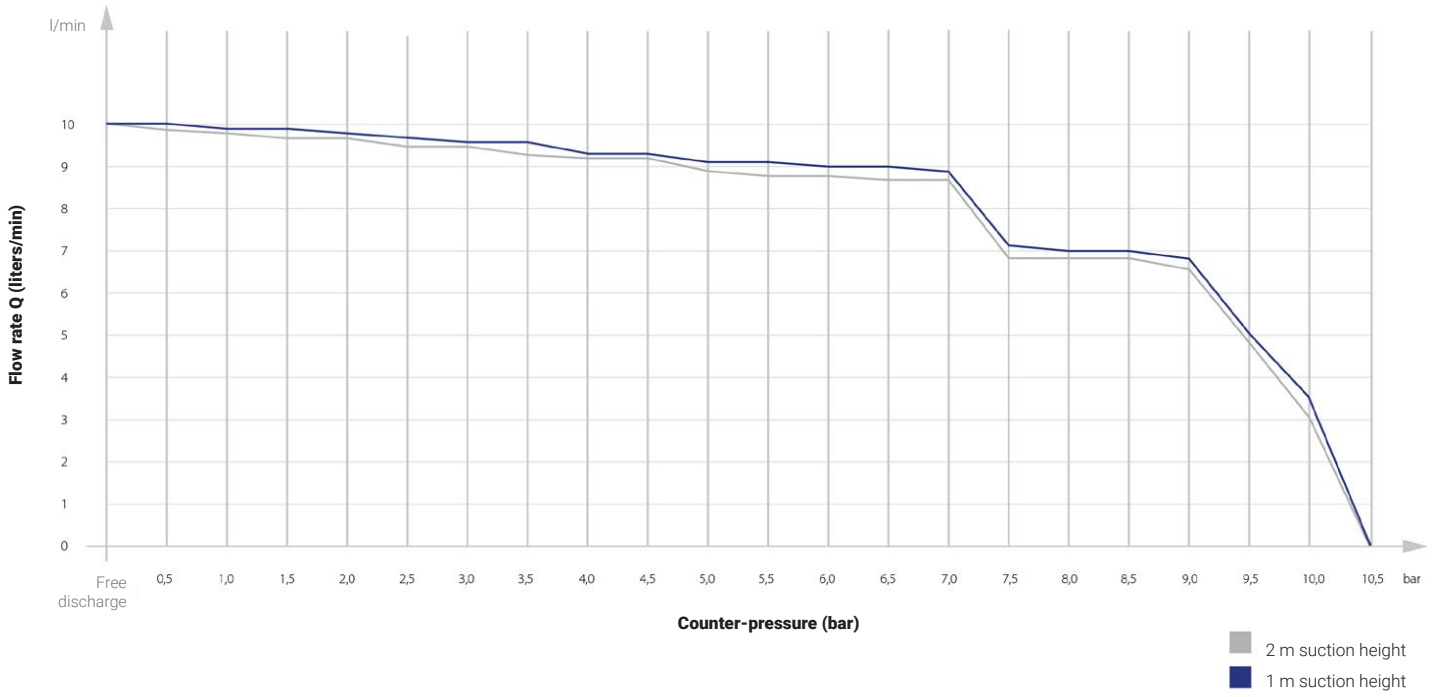
The oil pump has been designed for indoor operation. Choose a mounting location where proper operation is possible.

5. Technical data

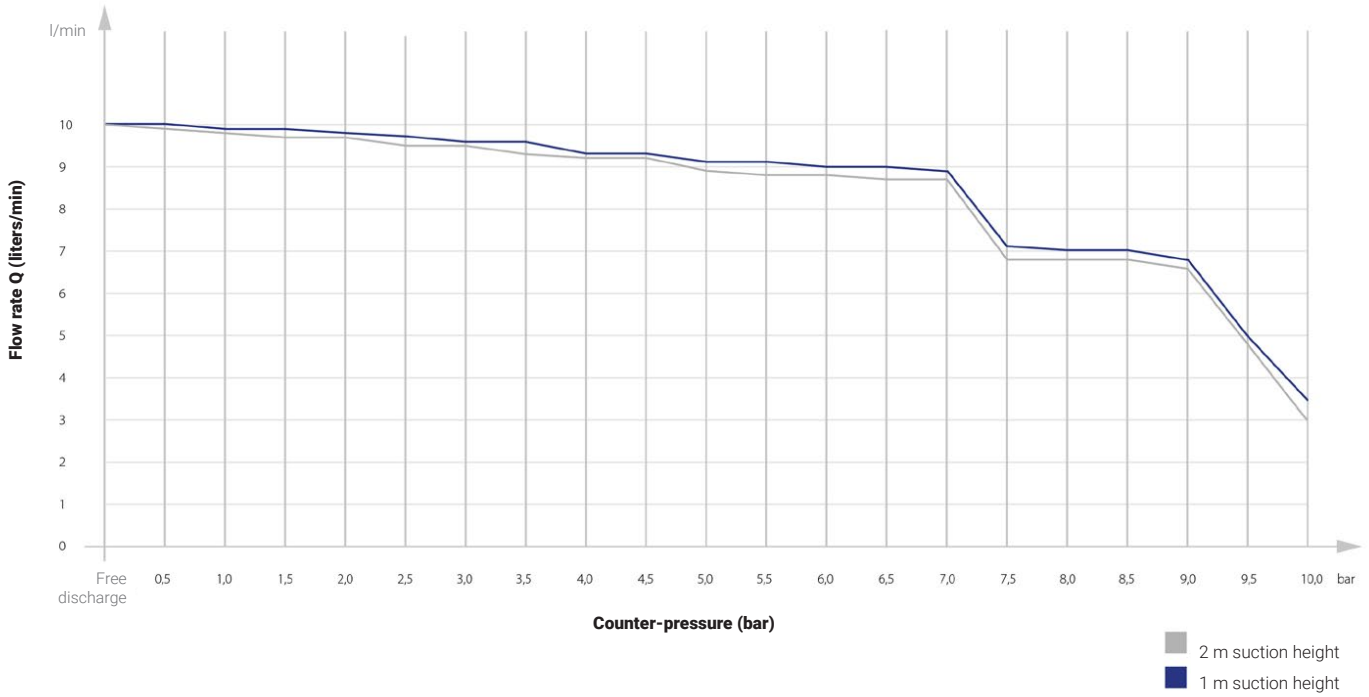
Indication		Internal gear oil pump 10 l/min. 230 V-1~ AC-50 Hz-0,5 kW	Internal gear oil pump 10 l/min. DRST-230 V-1~ AC-50 Hz-0,5 kW	Internal gear oil pump 10 l/min. DRST-400 V-3~ AC-50 Hz-0,84 kW
Part No.		23 337	23 321 / 23 321 001	23 322 / 23 322 001
Pump design				
Connection suction side	G	¾ " a	¾ " a	¾ " a
Connection discharge side	G	½ " a	½ " a	½ " a
Permitted pump input pressure	bar	-0,5...0,5	-0,5...0,5	-0,5...0,5
Max. operating pressure	bar	10	10	16
Max. delivery rate under free discharge	l/min.	10	10	10
Max. suction height	m	3	3	3
Direction of rotation		right	right	right
Pumping media		oils up to SAE 90	oils up to SAE 90	oils up to SAE 90
Operating temperature area	°C	+10 to +60	+10 to +60	+10 to +60
Motor data				
Voltage	V / AC	230	230	400
Frequency	Hz	50	50	50
Power consumption	A	5,5	5,5	2,2
Power	kW	0,56	0,56	0,84
Rotation speed	U/min.	1450	1450	1450
Torque	Nm	2	2	3,5
Safety class		IP 66	IP 66	IP 66
Type of construction		IMP 3	IMP 3	IMP 3
Running capacitor		µF 20/450	µF 20/450	/
Thermal protection		self resetting	self resetting	self resetting
Connecting cable	m	2	2	2
Materials of parts in contact with liquid				
Pump housing		EN-GJS-400-18-LT – 5.3103		
Gearwheel		16MnCr5-EC80 – 1.7131		
Shaft		C40 – 1.0511		
Slide bearing		socket TM 1525 DU		
Seal		NBR 70		
Weight	kg	12,6	14,7 (23 321) 14,76 (23 321 001)	14,7 (23 322) 14,76 (23 322 001)
Dimensions	mm	290 x 200 x 210	310 x 320 x 205	310 x 320 x 205

5.1 Pump characteristics

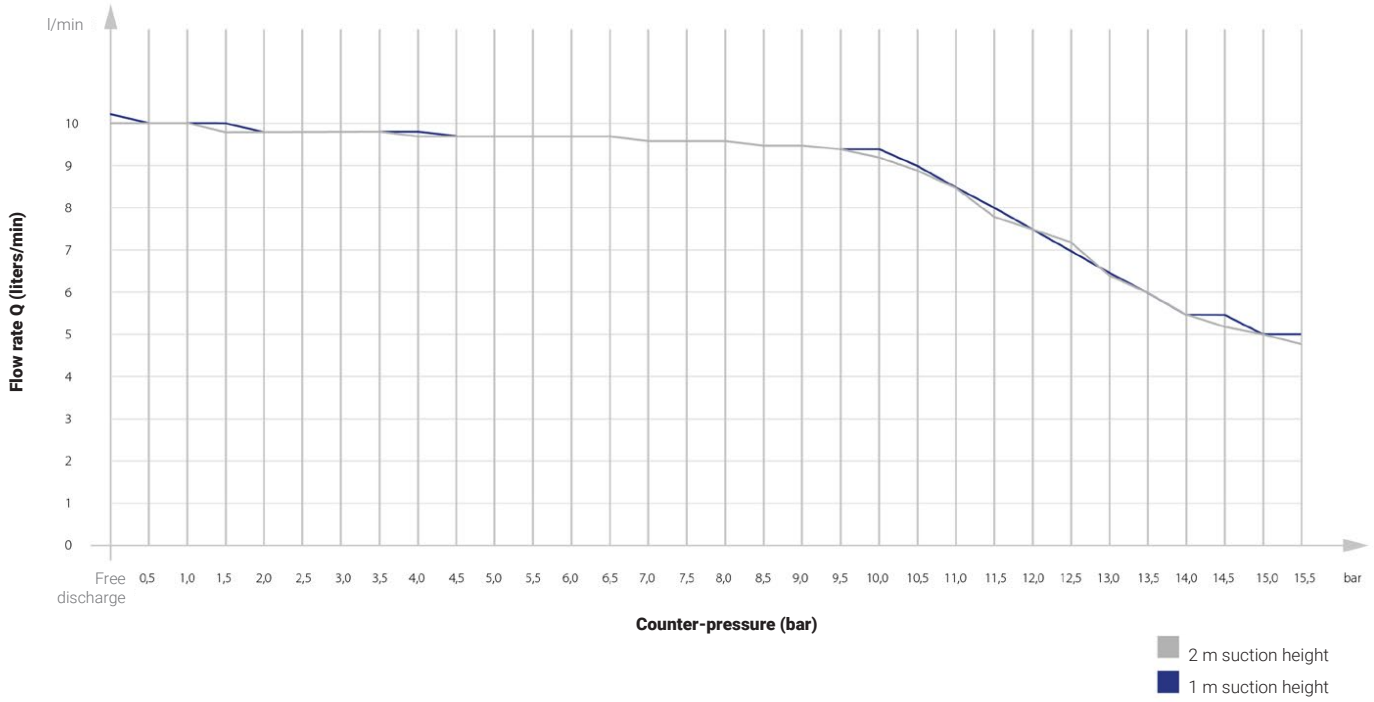
Pump **23 337**



Pump **23 321 / 23 321 001**



Pump **23 322 / 23 322 001**



6. Assembly

Four M6 bolts (not included in the scope of delivery) are required for the stationary installation of the oil pump at its operating location.

When installing the pump, ensure that it is mounted on a stable surface. Select a secure location (protected from splash water, damage and theft).

No stress or torque shall be exerted on the pump from the suction and pressure pipes, possibly it may be necessary to support the pipes in front of and behind the pump.

The pipes must be sufficiently dimensioned. They shall not be smaller than the nominal size of the pump connections.

In order to prevent foreign particles from being sucked in, a suction strainer must be used in order to protect the pump from damage. Due to its inner resistance, the suction strainer must be sufficiently dimensioned, because it affects the suction capability of the pump.

Elbows and bends which may be necessary in the pipe system should be chosen as large as possible. The suction line should have a continuous rise to the pump.

When fitting the pipes, check to ensure that the pipes are free from swarfs or similar impurities.

DANGER

Danger of contact with energized components

- Before connecting the pump to the voltage source, check to ensure that the pump is switched off!
- Only authorized persons are allowed to work on the electric system of the pump.

ATTENTION

Risk of product damage

- The power source must be of the correct voltage for the pump type.

ATTENTION

Risk of product damage

In order to prevent dirt from entering the pump chamber, it is absolutely necessary to install a strainer with a pre-cleaner in the suction line, because otherwise the warranty may be invalidated.

Installation material for pressure pipes:

- Pipe length up to 15 m: threaded tube DN 20 (R ¾“) DIN 2448 or larger; St 37 according to DIN 1629
- Pipe length of more than 15 m: threaded tube DN 32 (R 1“) DIN 2448 or larger; St 37 according to DIN 1629
- Return line:
  Run the hose through a suitable opening in the tank or barrel.
  Do not lengthen or squeeze the hose line.
  For wall-mounted installations, or if the installation is in a non-visible area, a copper feed pipe with self-tapping fittings must be used.
  The pump is now ready for commissioning.

NOTE

- Ensure cleanliness during installation, and that all accessories/attachments are correctly connected and sealed.

6.1 Before commissioning

After the complete assembly, the pump and the pipe system must be checked once again on the basis of the following questions:

- Is it possible to turn the pump by hand?
- Are the connections correctly fitted at the suction side and at the delivery side?
- Does the motor's direction of rotation correspond to the pump's direction of rotation?
- Has the system been checked for leaks in the pipe system?
- Is there enough fluid/oil in the tank?

7. Commissioning and operation

CAUTION

Risk of injury because of uncontrolled pump movement

- The pump may only be operated if it is fixed at the intended position close to the storage container.
- The pump is only allowed to be operated if it is firmly screwed down, so that it cannot carry out any uncontrolled movements.
- The pump may only be operated if the storage container, to which the pump is connected, stands on a firm and level surface.

- Prior to work, check to ensure that the oil pump and the fitted accessories are complete and free from any damage. Replace any damaged components immediately. Never use the pump if damaged.

CAUTION

Risk of minor personal injury

- The pump may only be operated if the formation of electrostatic charges is avoided by a suitable potential equalization (grounding cable)!

- After initial start-up, check the pump and the connections for tightness.

NOTE

In order to prevent dirt from entering the pump chamber, it is absolutely necessary to install a strainer with a pre-cleaner in the suction line, because otherwise the warranty may be invalidated!

ATTENTION

Risk of product damage

- Never operate the pump for longer than 2 minutes without a fluid. The pump may be damaged by running dry.

Venting the pump and the system

Pump

- Start the gear pump.
- Put the venting hose into a suitable collection receptacle.
- Use a screwdriver to slowly open the venting screw by one or, at the most, two turns.
- Wait until all air has escaped and only oil comes out of the venting hose.
- Close the venting screw again.

Facility / system

- Open the nozzle at the furthest dispenser in the system, over a suitable collection receptacle until oil emerges free of bubbles.
- Repeat this process for each dispenser.

Bypass

- During a trial run in the factory, the bypass is checked for proper function.
- The pump is set to an operating pressure of 10 bars (230 V) or 16 bars (400 V).
  Depending on the oil viscosity or the pipe lengths, pressure changes may become necessary.
- Use the knurled nut (Fig. 12-1, Pos. 1) to do this.
  Clockwise = Increase pressure
  Anticlockwise = Reduce pressure.

CAUTION

- Adjust the knurled nut very carefully, because a small adjustment can result in a large pressure change.
- Adhere to the maximum pressure for the downstream installation!

- Ensure that the oil pump runs when a nozzle valve is opened. The pump should switch off only when the nozzle valve is closed. (For the variants with pressure switch 23 321, 23 322).

Diaphragm-Pressure Switch

CAUTION

- The maximum pressure of 10 bar (230 V) or 16 bar (400 V) must not be exceeded! The switch-on pressure should be 5 bar (230 V) or 9 bar (400 V) and should be neither higher nor lower.

- The above values are preset as switch on- and off pressure base settings.

NOTE

Carry out pressure adjustments with nozzle valve open!

Adjusting the switch-off pressure:

– Remove the pressure switch housing.
– Using a screwdriver, turn the pressure value screw A anticlockwise or clockwise to adjust the switch-off pressure. (see Fig. 7-1).

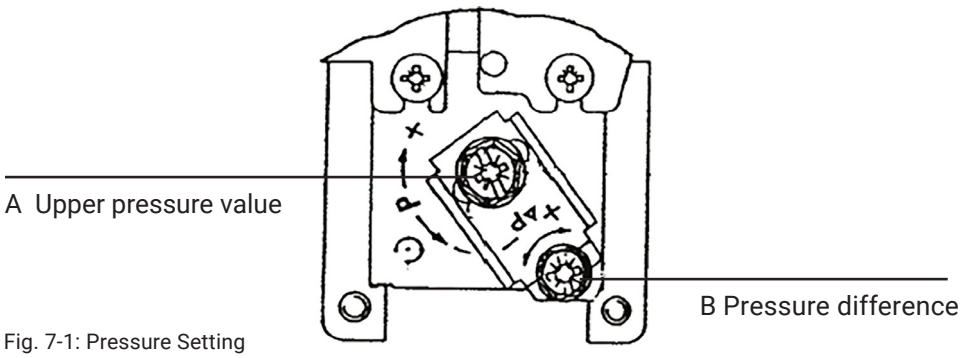


Fig. 7-1: Pressure Setting

– Normally, the pump continues to run. Turn the pressure value screw A anticlockwise until the pump switches off.
– To ensure that the pump will switch off correctly during a filling operation, turn the pressure value screw A up to a maximum of one more turn when the nozzle valve is closed.

CAUTION

- The maximum pressure of 10 bar (230 V) or 16 bar (400 V), as switch-off pressure for the pump must not be exceeded.

Adjusting the switch-on pressure:

– The pressure difference screw B is used to set the switch-on point:
Clockwise = switch point higher.
Anitclockwise = switch point lower

– On completion, check the stability of the switching points by operating the nozzle valve several times. To guarantee ideal operation of the pressure switch, the oil temperature in the container should not fall below +20 °C. Therefore do not store the oil barrels outside.

Operation

NOTE

To ensure that the tank can be completely emptied, the suction hose must reach to the bottom of the tank.

– Switch on the pump, the installation is ready for operation.

CAUTION

- Never operate the pump without delivery fluid.There is a risk of damage to your oil pump if operated dry.

– In installations fitted with a diaphragm pressure switch, the pump switches on and off automatically whenever the nozzle valve is operated.

CAUTION

- If the installation does not need to be operated for a long period, it must be switched off completely (in any case, during the night, at weekends etc.).

8. Preventive Maintenance

The oil pump is very easy to maintain and to service.

Maintenance work has always to be done by qualified technical personal.

DANGER

Danger of contact with energized components

- When working on the electrical system of the pump, disconnect the pump also from the power supply and protect it against restarting!

CAUTION

- Regularly check the hoses and their seals. Replace any damaged parts immediately.

In order to avoid environmental or equipment damage or personal injury, the following parts must be regularly checked and replaced if necessary:

- Pump housing
- Delivery valve
  - Hoses
  - Pipes

9. Maintenance

Maintenance must be done by qualified technical personnel. External impact may cause a loss of performance, constitute a risk of damage to persons and/or property and void the guarantee.

Observe the following recommendations for operating the pump:

DANGER

Danger of contact with energized components

- When working on the electrical system of the pump, disconnect the pump in addition from the power supply and protect it against restarting!
- Before performing any maintenance work, disconnect the oil pump from all electric and hydraulic supply sources.

- Wear personal protective equipment when carrying out maintenance.
- If there is danger of freezing, the pump and the circuit must be emptied and stored at a location with a temperature not dropping below 0°C.
- Check to ensure that the labels and decals have not become illegible and have not come loose in the course of time.
- Check at regular intervals that the line connections have not worked loose in order to avoid that liquid escapes.
- Regularly check and clean the suction line filter.
- From time to time, check the pump housing and remove any dirt.
- Check to ensure that the power cables are in perfect working order.

10. Accessories

- Dual suction pipe, 2 m, No. 19 511
- Suction pipe, for oil, 2 m, G ¾ " l, G ¾" o, No. 19 512
- Suction tube, G ¾" l, G 2" o, SRL 860, for 200/220 l container, No. 19 522
- Suction tube, G ¾" l, G 2" o, SRL 860, for 200/220 l container, with foot valve, No. 19 523
- Suction tube, G ¾" l, G 2" o, SRL 1600, for tank mounting, with foot valve, No. 19 523 001
- Suction tube, G ¾" l, G 2" o, SRL 2100, for tank mounting, with foot valve, No. 19 523 954
- Suction set, G ¾" l, G 2" o, SRL 1600, for tank mounting, No. 19 523 002
- Overflow valve 18 bar, for pressure switch, No. 23 128

11. Spare Parts

You can order the following orginal spare parts for your oil pump through the FMT-Service:

- Bypass for 230 V, No. 85 008
- Bypass for 400 V, No. 85 002
- Pressure switch for 230 V, No. 00 338
- Pressure switch for 400 V, No. 00 340
- Venting valve for 230 V and 400 V, No. 85 006
- Diaphragm pressure switch 230 V, No. 85 003
- Diaphragm pressure switch 400 V, No. 85 004

NOTE

Only the use of original spare parts will ensure the proper functioning of your oil pump! To avoid faulty operation and danger, please use only original spare parts.

12. Troubleshooting

12.1 Variant without pressure switch

Malfunction	Cause	Solution
The pump is running, but does not deliver oil	The oil container is empty	Change the barrel or fill up the tank
The oil pump does not suck in	There is air in the suction line	Check the suction line for tightness.
		Vent the system by means of the venting valve (refer to chapter 7)
The delivery rate is too low	The fluid temperature is too low	Store the barrel in a heated room
	The bypass is dirty	Check/clean the bypass
	The bypass is set too low	Adjust the bypass correctly (refer to chapter 7)
	Suction line too long or suction height too high	Suction line resistance too high
	Voltage too low	Check the voltage
The oil pump does not run	The power supply is interrupted	Check the connection cable and the fuses

12.2 Variant with pressure switch (accessory)

Malfunction	Cause	Solution
The pump continuously switches on	The check valve is defective (refer to manual for the pressure switch)	Replace the check valve by a genuine FMT spare part
	The switch-on pressure is too high	Adapt the switch-on pressure in the configuration of the pressure switch
The pump continuously switches on and off when pumping	The pump output is too high	Slightly turn out the set screw of the bypass until the pump runs continuously (refer to chapter 7)
The pump does no switch off or the switch-off pressure is not reached	The pressure switch is set too high, thus, the pump output is too low	Correct the switch-off pressure in the configuration of the pressure switch
	The bypass is set too low	Slightly turn in the set screw of the bypass until the pump switches off (refer to chapter 7)

13. Repair / Service

The oil pumps have been developed and produced according to the highest quality standards.

Should a problem develop, despite of all quality controls, please contact our customer service:

FMT Swiss AG
Phone +49 9462 17-246 | Fax +49 9462 1063 | service@fmtag.ch

14. Disposal

The operating company is responsible for the proper disposal of the pump.

Hereby, the industry-specific and local regulations must be observed when disposing the different materials.

Only qualified personnel is authorized to disassemble and dispose of the oil pump.

15. EC Declaration of Conformity

CE

Manufacturer:

FMT Swiss AG
Fluid Management Technologies Swiss AG
6330 Cham / Switzerland
declares under his sole responsibility that the machine:

Model	Part No. **23 337** 230 V-1~AC-50 Hz-0,5 kW · 10 l/min Part No. **23 321** DRST-230 V-1~AC-50 Hz-0,5 kW · 10 l/min Part No. **23 322** DRST-400 V-3~AC-50 Hz-0,84 kW · 10 l/min Part No. **23 321 001** DRST-valve-230 V-1~AC-50 Hz-0,5 kW · 10 l/min Part No. **23 322 001** DRST-valve-400 V-3~AC-50 Hz-0,84 kW · 10 l/min
Motor voltage	230 V / 400 V
Function	Gear pumps
complies with all relevant provisions of the following directive:	
EC directives	2006/42/EC Machinery Directive 2014/35/EU Low Voltage Directive
Applicable standards	EN 60204-1:2018; EN 809:1998+A1:2009+AC:2010; EN ISO 12100:2010-11; EN ISO 19353:2019; EN 60335-1/A14:1998-08

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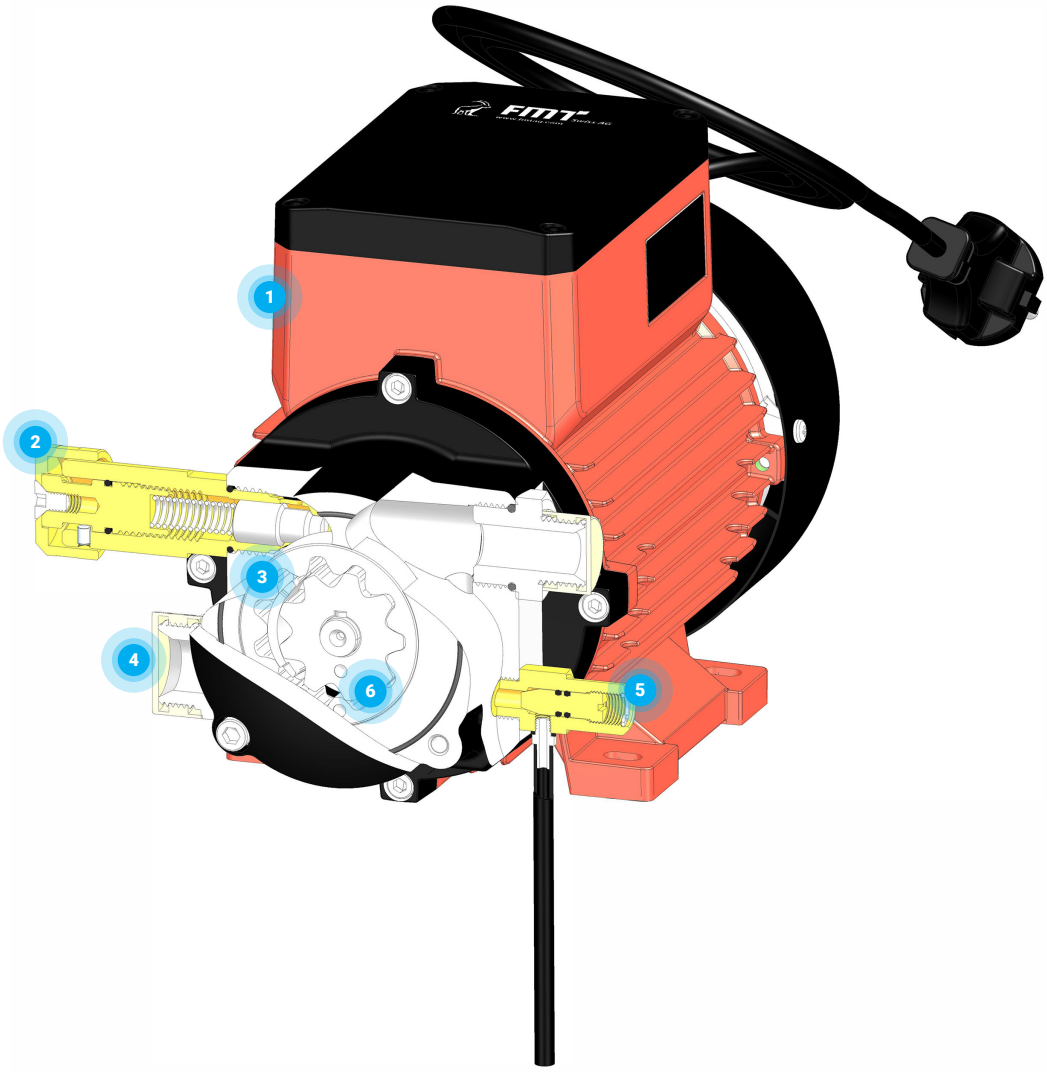
FMT Swiss AG
Cham, 28.01.2022

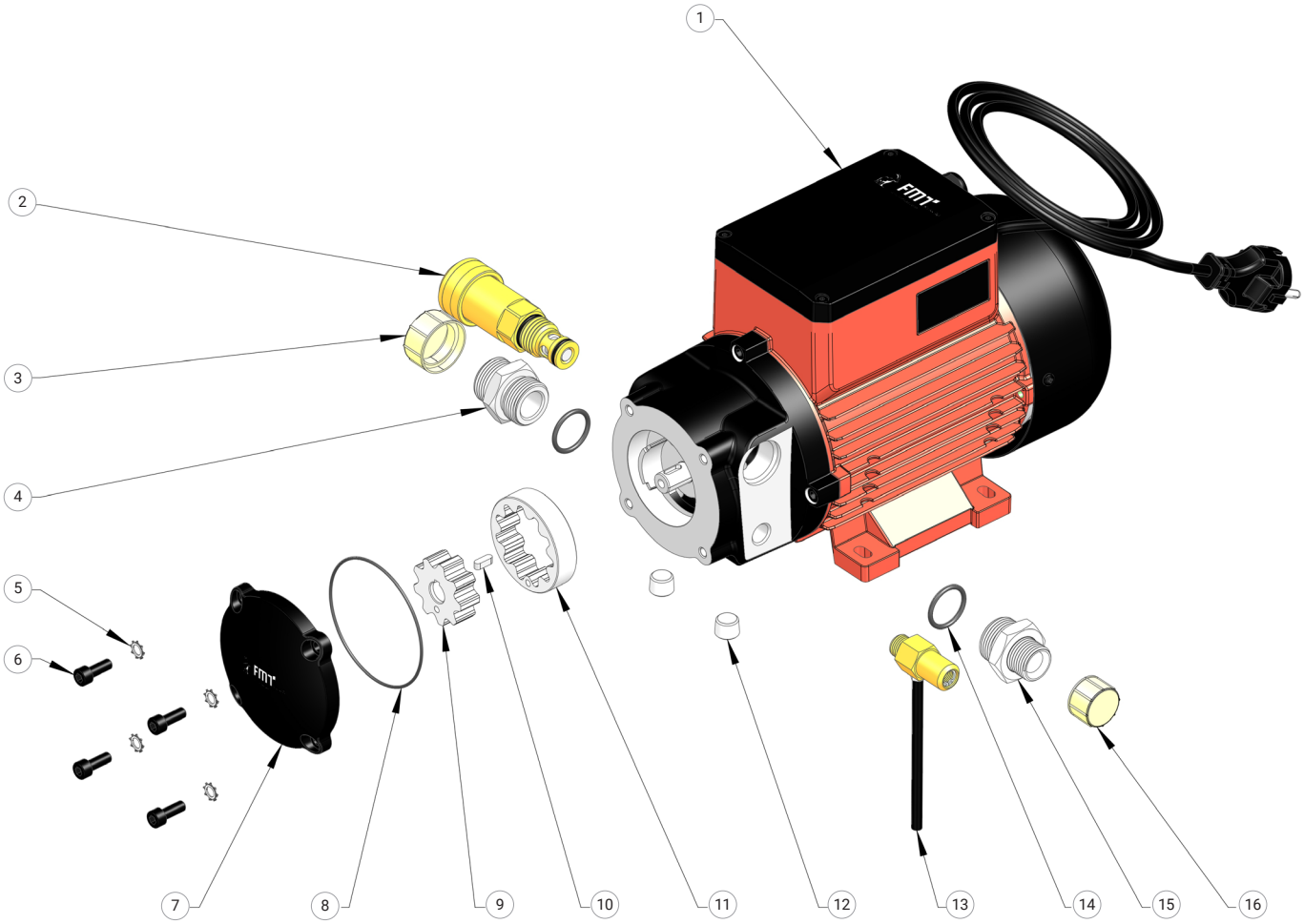
Dipl.-Ing. Rudolf Schlenker
(Managing Director)

16. Internal gear oil pump 10 l/min 230 V-1~AC-50 Hz-0,5 kW

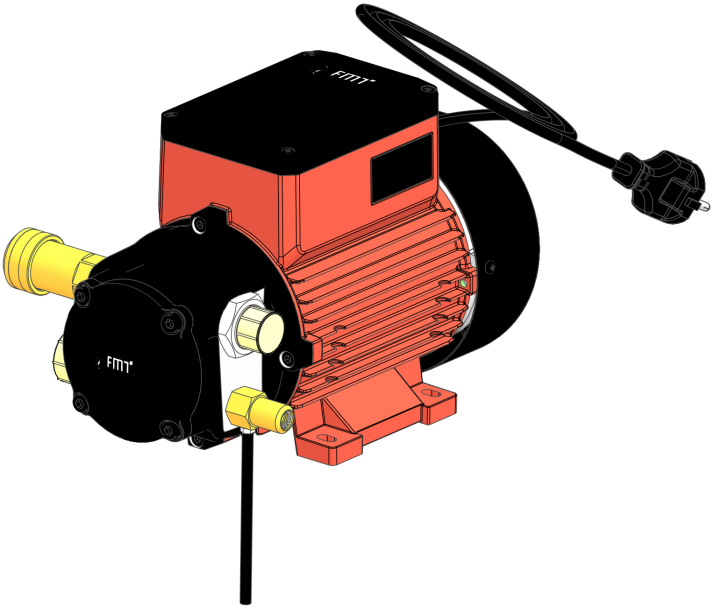
Part No. **23 337**

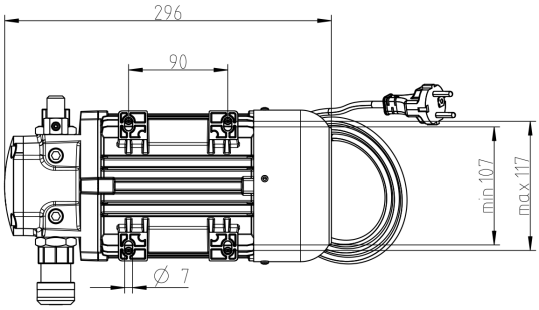


Pos.	Part No.	Designation
1	86477	Electric motor 230 V-50 Hz-10 l/min
2	85008	Overflow valve gear pump 230 V
3	89367	Internal gear wheel Z 11 1. 7131-0.0970 kg-Ø57.0x13.93
4	00926	Adapter G 3/4“ / G 3/4“ 3.1645-0,0375 kg-35,5x37x32
5	85006	Venting valve cpl. 0.0758 kg-21.9x123.0x45.0
6	89374	External gear wheel Z 9 1. 7131-0.0837 kg-Ø40.2x13.9



Pos.	Quantity	Part No.	Designation
1	1	86477	Electric motor 230 V-50 Hz-10 l/min
2	1	85008	Overflow valve gear pump 230 V
3	1	01501	Screw cap
4	1	00926	Adapter G 3/4“ / G 3/4“
5	4	89647	Toothed lock washer DIN 6797
6	4	88419	Cheese head screw M 6x16
7	1	89379	Pump cover 10 lit. gear pump
8	1	00290	O-Ring-NBR 70-75x1,5
9	1	89374	External gear wheel Z 9
10	1	00603	Parallel key DIN 6885 A
11	1	89367	Internal gear wheel Z 11
12	2	00260	Screw plug R 1/4”
13	1	85006	Bleeder valve cpl.
14	2	00914	O-Ring-NBR 70-22x2,5
15	1	00928	Adapter G 3/4“ / G 1/2“
16	1	01414	Screw cap

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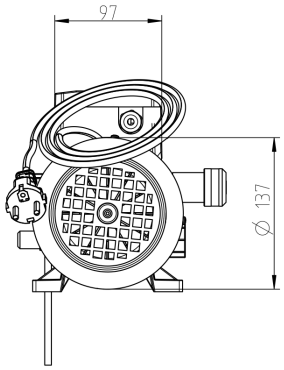
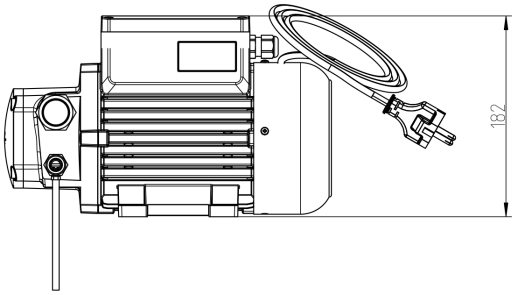
min 107
max 117
Ø 7


97
Ø 137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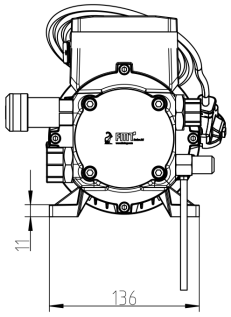
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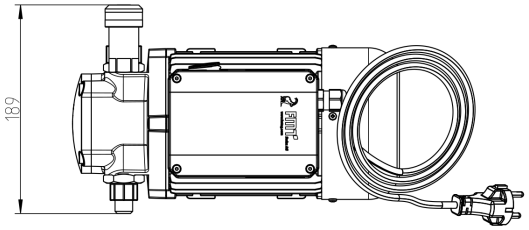
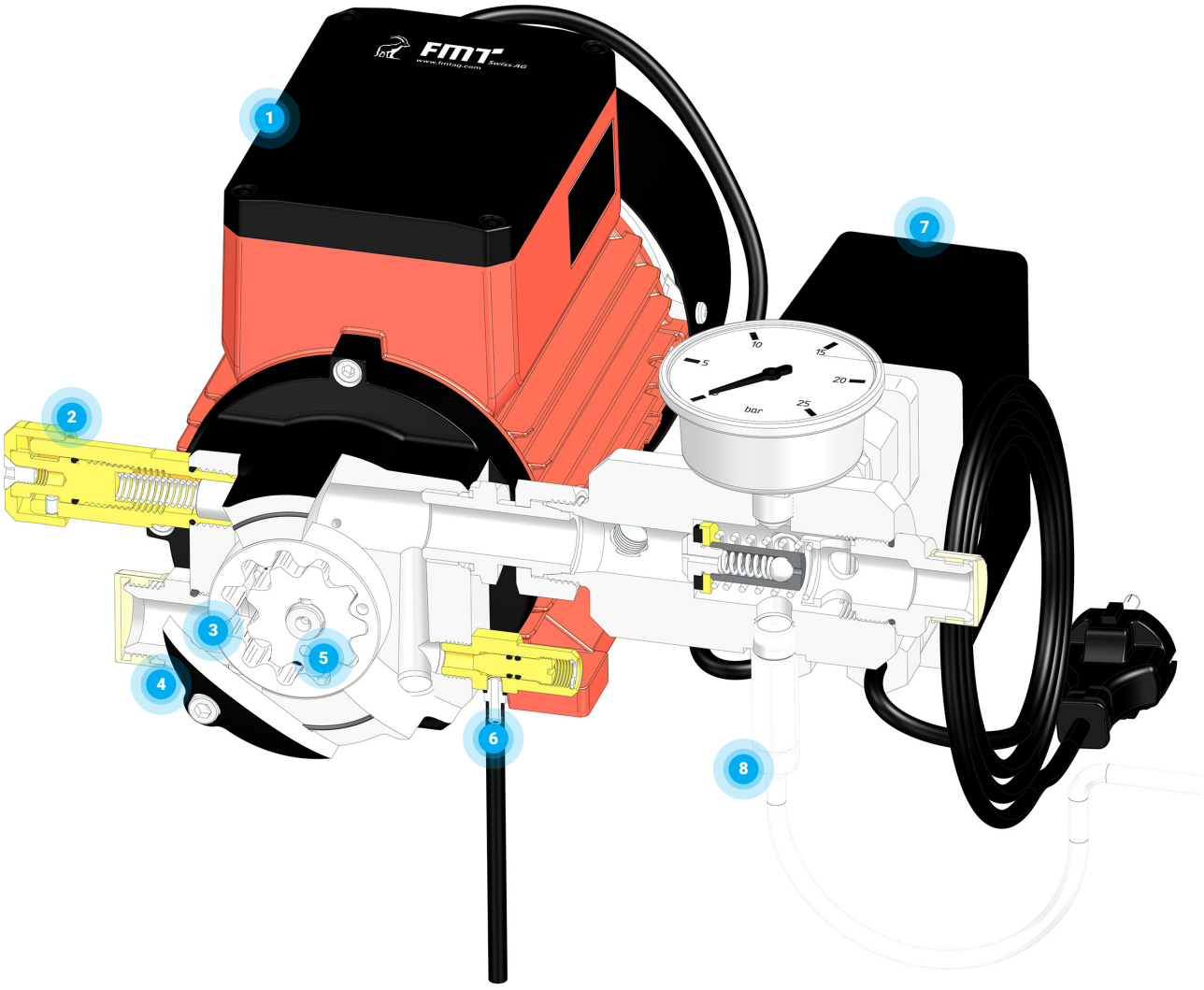
136

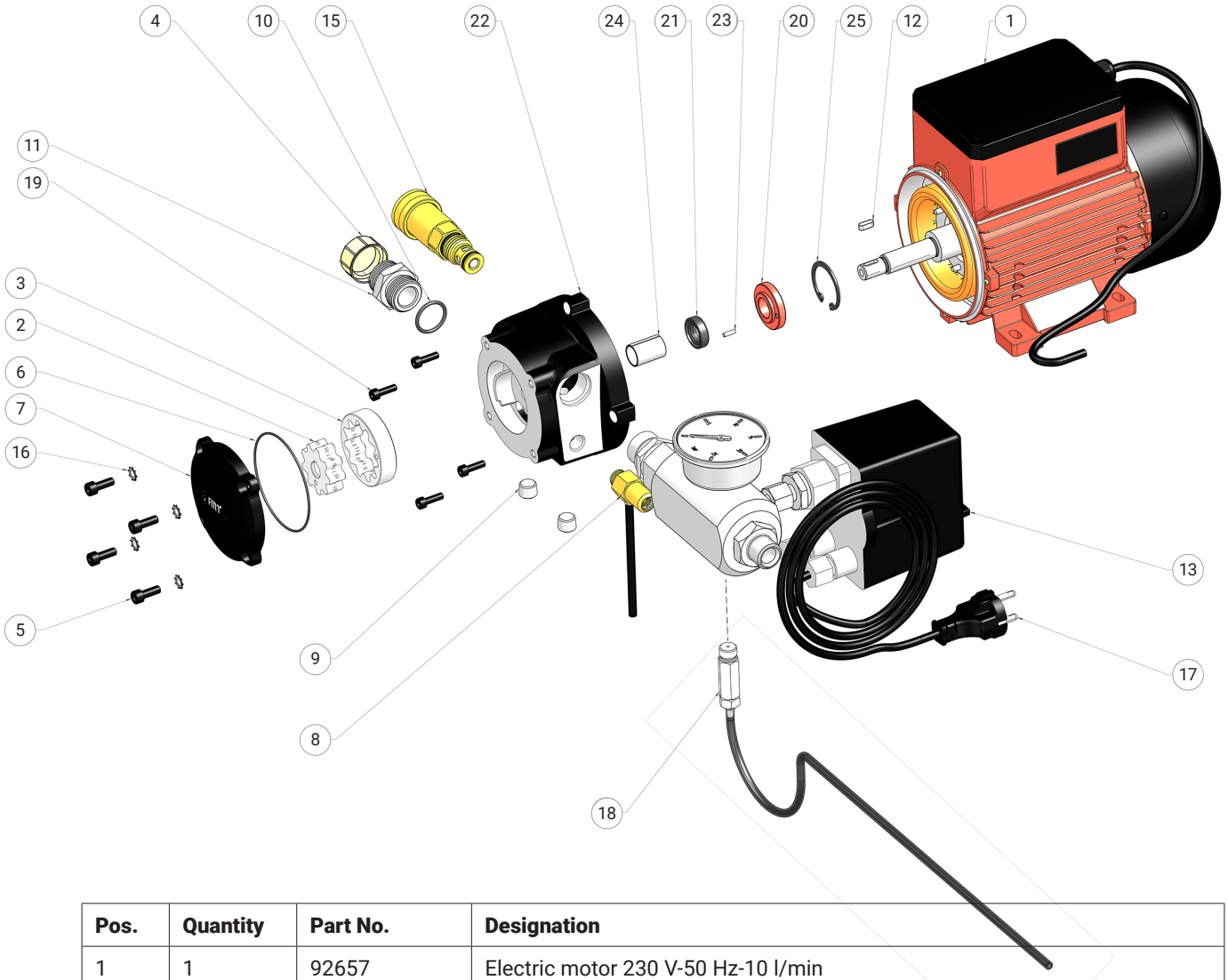

189

17. Internal gear oil pump 10 l/min

Part No. **23 321 / 23 321 001**

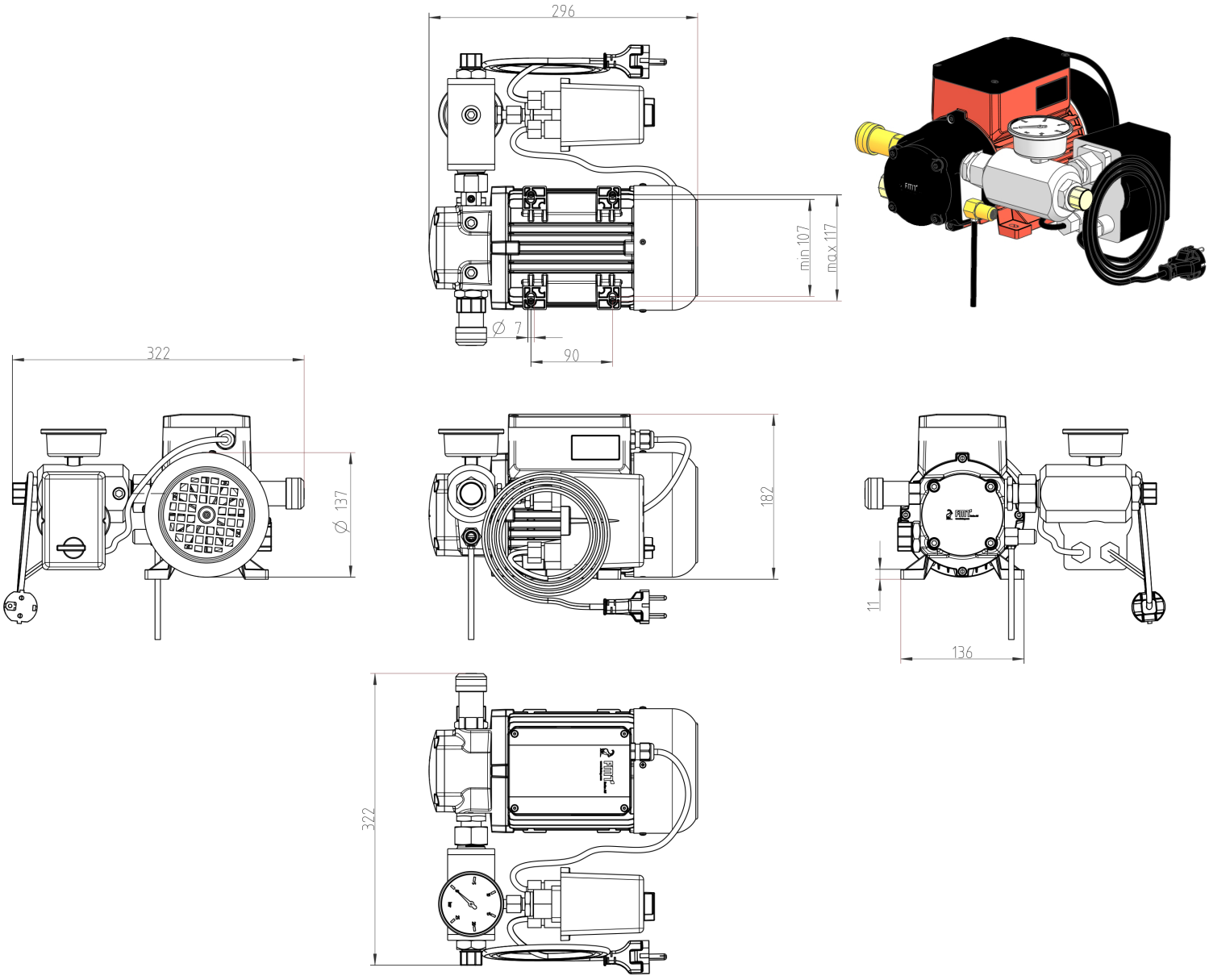


Pos.	Part No.	Designation
1	92657	Electric motor 230 V-50 Hz-10 l/min
2	85008	Overflow valve gear pump 230 V
3	89367	Internal gear wheel Z 11 1.7131-0.0970 kg-Ø57.0x13.93
4	00926	Adapter G 3/4“ / G3/4“ 3.16455-0,0375 kg-35,5x37x32
5	89374	External gear wheel Z 9 1.7131-0.0837 kg-Ø40,2x13,93
6	85006	Vent valve
7	85003	Diaphragm pressure switch 230 V
8	23128	Overflow valve 18 bar (only for version 23 321 001)



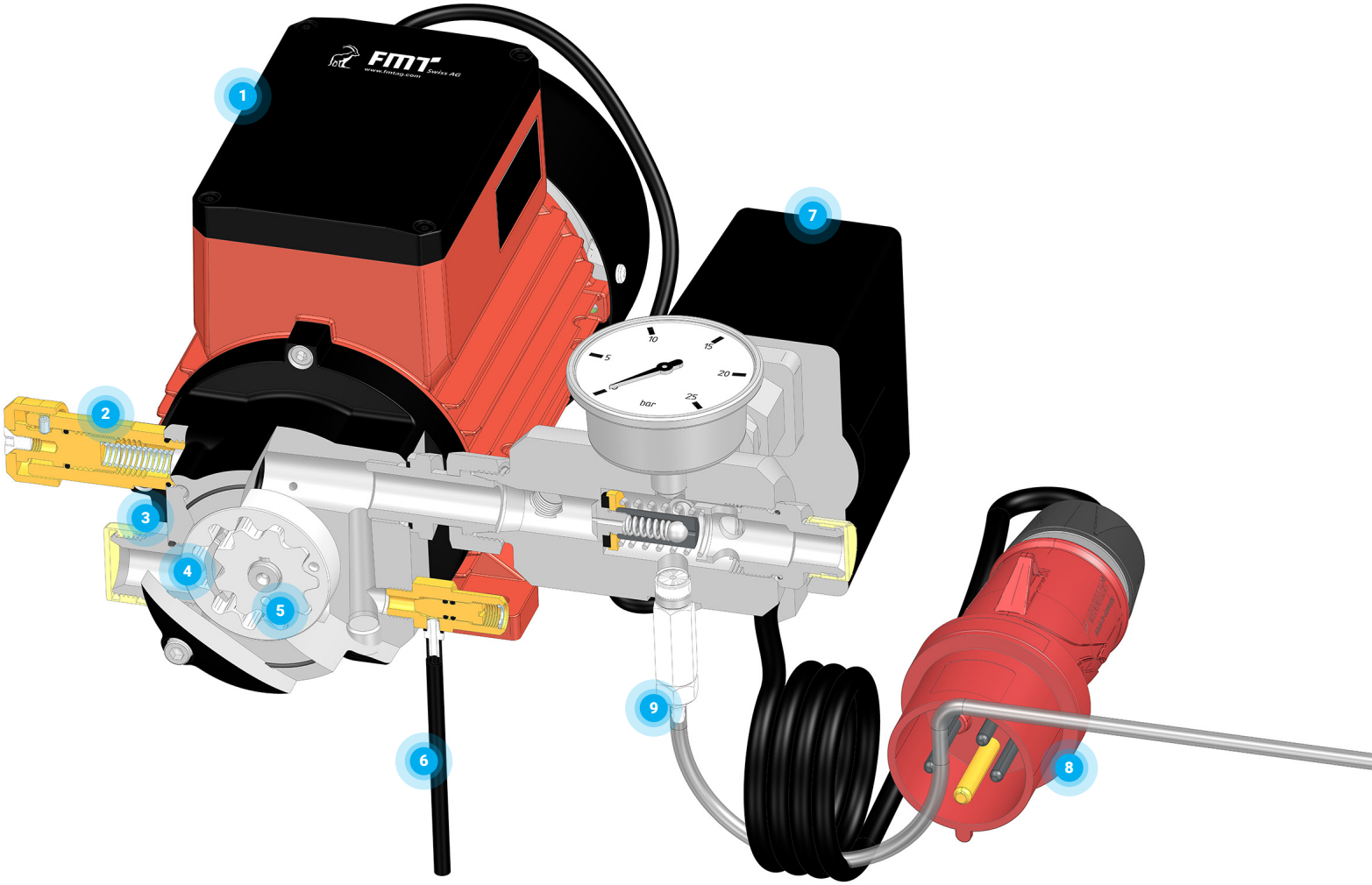
Pos.	Quantity	Part No.	Designation
1	1	92657	Electric motor 230 V-50 Hz-10 l/min
2	1	89374	External gear wheel Z 9
3	1	89367	Internal gear wheel Z 11
4	1	01501	Screw cap
5	4	88419	Cheese head screw M 6x16
6	1	00290	O-Ring-NBR 70-75x1,5
7	1	89379	Pump cover 10 lit. gear pump
8	1	85006	Bleeder valve cpl.
9	3	00260	Screw plug R1/4”
10	1	00914	O-ring-NBR 70-22x2,5
11	1	00926	Adapter-G 3/4“ a-G 3/4“ a
12	1	00603	Parallel key DIN 6885 A
13	1	85003	Diaphragm pressure switch 230 V
14	1	01414	Screw cap
15	1	85008	Overflow valve gear pump
16	4	89647	Toothed lock washer DIN 6797

17	1	83912	Cable H 07 RN - F 31.5
18	1	23128	Overflow valve 18 bar (only for version 23 321 001)
19	4	00236	Cheese head screw M 5x16
20	1	00263	Combination disk-RG10-Ø35,9-L8,5
21	1	00261	Oil seal NBR 70 15x24x7
22	1	83942	Pump and motor flange oil pump 230V
23	1	00359	Cylindrical pin DIN 6325
24	1	89356	Socket TM 1525 DU
25	1	00267	Circlip DIN 472 J

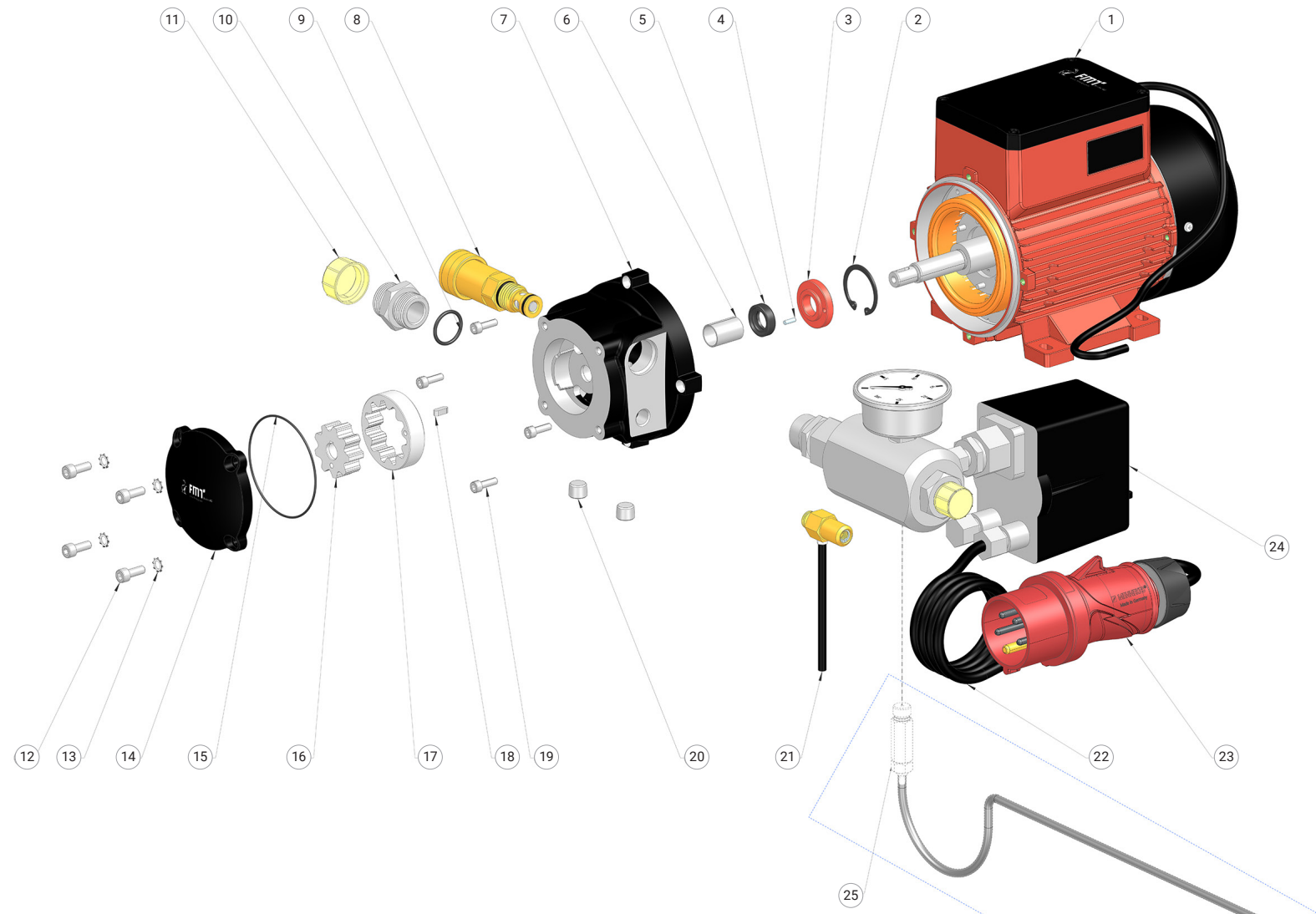


18. Internal gear oil pump 10 l/min

Part No. **23 322 / 23 322 001**

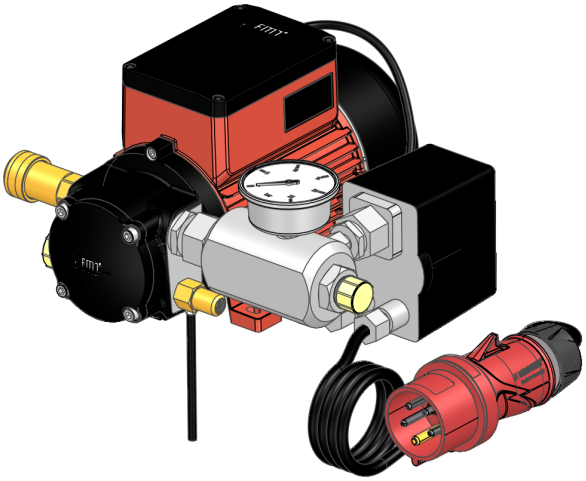


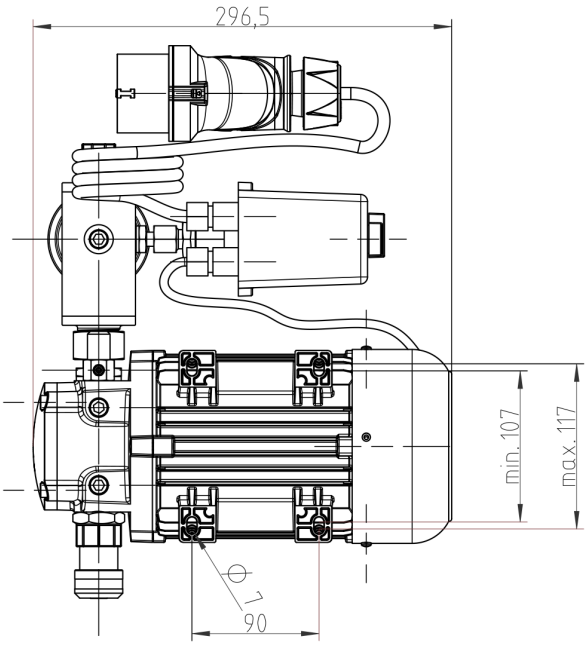
Pos.	Part No.	Designation
1	93580	ELM-MEC 71-380 V-50 Hz-1,1kW-1450 revs/min
2	85002	Overflow valve gear pump 380 V
3	00926	Adapter G 3/4“ / G3/4“ 3.1645-0,0375 kg-3,5x37x32
4	89367	Internal gear wheel Z 11 1.7131- 0.0970 kg-Ø57.0x13.93
5	89374	External gear wheel Z 9 1.7131-0.0837 kg-Ø40,2x13,93
6	85006	Venting valve compl. 0.0758 kg-21,9x123,0x45,0
7	85004	Diaphragm pressure switch 400 V
8	87142	CEE plug / phase inverter 16 Amp
9	23128	Overflow valve 18 bar (only for version 23 322 001)

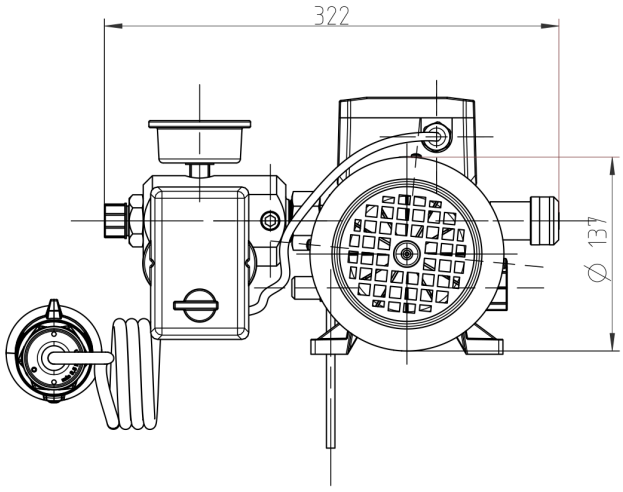


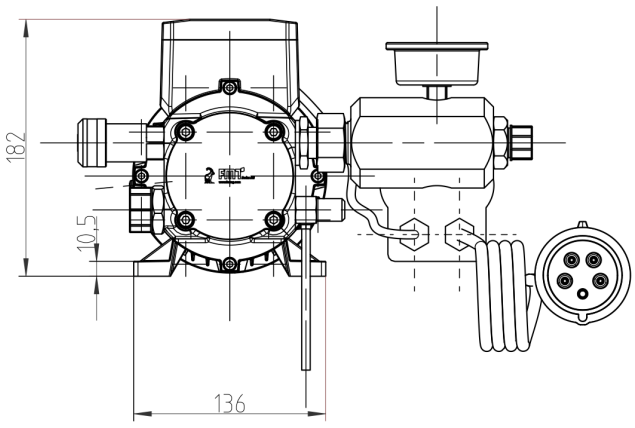
Pos.	Quantity	Part No.	Designation
1	1	93580	ELM-MEC 71-380 V-50 Hz-1.1 kW
2	1	00267	Circlip DIN 472 J
3	1	00263	Combination disk-RG10-Ø35,9-L8,5
4	1	00359	Cylindrical pin DIN 6325
5	1	00261	Oil seal NBR 70 15x24x7
6	1	89356	Socket TM 1525 DU
7	1	83942	Pump and motor flange oil pump 230V
8	1	85002	Overflow valve gear pump
9	1	00914	O-ring-NBR 70-22x2,5
10	1	00926	Adapter G 3/4“ / G 3/4“
11	1	01501	Screw cap
12	4	88419	Cheese head screw M 6x16
13	4	89647	Toothed lock washer DIN 6797
14	1	89379	Pump cover 10 lit. gear pump

15	1	00290	O-Ring-NBR 70-75x1,5
16	1	89374	External gear wheel Z 9
17	1	89367	Internal gear wheel Z 11
18	1	00603	Parallel key DIN 6685 A
19	4	00236	Cheese head screw M 5x16
20	3	00260	Screw plug R1/4”
21	1	85006	Bleeder valve cpl.
22	1	04534	Oil flex cable, YSLY JZ
23	1	87142	CEE plug / phase inverter 16 Amp
24	1	85004	Diaphragm pressure switch
25	1	23128	Overflow valve 18 bar (only for version 23 322 001)




296,5
min. 107
max. 117
Ø 7
90


322
Ø 137


182
10,5
136

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Operating Instructions and Safety Notes